Bikini Bottom Genetics 2 Name Answers.

Use your knowledge of genetics to complete this worksheet.

1. Use the information for SpongeBob's traits to write the phenotype (physical appearance) for each item.

Characteristic	Dominant Gene	Recessive Gene
Body Shape	Squarepants (S)	Roundpants (s)
Body Color	Yellow (Y)	Blue (y)
Eye Shape	Round (R)	Oval (r)
Nose Style	Long (L)	Stubby (l)

(a) LL- long nose
(b) yy- blue body
(c) Ss- Square
(d) RR - round
(e) Rr- round
(f) ll- stubby
(g) ss- round
(h) Yy - yellow

2. Use the information in the chart in #1 to write the genotype (or genotypes) for each trait below.

(a) Yellow body - Yy or YY
(b) Roundpants - ss
(c) Oval eyes - rr
(d) Long nose - LL or Ll
(e) Stubby nose - ll
(f) Round eyes - RR or Rr
(g) Squarepants - SS or Ss.
(h) Blue body - yy.

3. Determine the genotypes for each using the information in the chart in #1.

(a) Heterozygous round eyes - Rr
(b) Purebred squarepants - SS
(c) Homozygous long nose - LL
(d) Hybrid yellow body - Yy.

4. One of SpongeBob's cousins, SpongeBillyBob, recently met a cute squarepants gal, SpongeGerdy, at a local dance and fell in love. Use your knowledge of genetics to answer the questions below.

(a) If SpongeGerdy's father is a heterozygous squarepants and her mother is a roundpants, what is her genotype? Complete the Punnett square to show the possible genotypes that would result to help you determine Gerdy's genotype.

	S	s
s	Ss	ss
s	Ss	ss

What is Gerdy's genotype? Ss

(b) SpongeBillyBob is heterozygous for his squarepants shape. What is his genotype? Ss

(c) Complete the Punnett square to show the possibilities that would result if Billy Bob & Gerdy had children.

	S	s
S	SS	Ss
s	Ss	ss

(d) List the possible genotypes and phenotypes for the kids.
SS, Ss = Square ; ss = round.

(e) What is the probability of kids with squarepants? 75 %

(f) What is the probability of kids with roundpants? 25 %

5. SpongeBob's aunt and uncle, SpongeWilma and SpongeWilbur, have the biggest round eyes in the family. Wilma is believed to be heterozygous for her round eye shape, while Wilbur's family brags that they are a pure line. Complete the Punnett square to show the possibilities that would result if SpongeWilma and SpongeWilbur had children.

(a) Give the genotype for each person. Wilma - Rr Wilbur - RR

(b) Complete the Punnett square to show the possibilities that would result if they had children.

	R	r
R	RR	Rr
R	RR	Rr

(c) List the possible genotypes and phenotypes for the kids.

RR or Rr = round eyes.

(d) What is the probability that the kids would have round eyes? 100 %

(e) What is the probability that the kids would be oval eyes? 0 %

6. SpongeBob's mother is so proud of her son and his new wife, SpongeSusie, as they are expecting a little sponge. She knows that they have a 50% chance of having a little roundpants, but is also hoping the new arrival will be blue (a recessive trait) like SpongeSusie and many members of her family. If SpongeBob is heterozygous for his yellow body color, what are the chances that the baby sponge will be blue? Create a Punnett square to help you answer this question.

	y	y
Y	Yy	Yy
y	yy	yy

50% chance of blue body.

7. SpongeBob's aunt is famous around town for her itty, bitty stubby nose! She recently met a cute squarepants fellow who also has a stubby nose, which is a recessive trait. Would it be possible for them to have a child with a regular long nose? Why or why not? Create a Punnett square to help you answer this question.

	l	l
l	ll	ll
l	ll	ll

~~[illegible] chance [illegible]~~

0%. Chance for long nose.

8. If SpongeBob's aunt described in #7 wanted children with long noses, what type of fellow would she need to marry in order to give her the best chances? Create a Punnett square to help you answer this question.

	l	l
L	Ll	Ll
L	Ll	Ll

She would have to marry a purebred long nosed fellow!

1. a)

	R	R
r	Rr	Rr
r	Rr	Rr

b)

	r	r
r	rr	rr
r	rr	rr

c)

	R	r
r	Rr	rr
r	Rr	rr

2. a)

	B	B
b	Bb	Bb
b	Bb	Bb

b)

	B	b
b	Bb	bb
b	Bb	bb

c)

	B	B
B	BB	BB
b	Bb	Bb

d)

	B	b
B	BB	Bb
b	Bb	bb

3. a)

♂ \ ♀	d	d
D	Dd	Dd
d	dd	dd

b)

♂ \ ♀	D	d
D	DD	Dd
d	Dd	dd

c)

♂ \ ♀	D	D
D	DD	DD
d	Dd	Dd

d)

♂ \ ♀	D	D
d	Dd	Dd
d	Dd	Dd

4. a)

	R	r
r	Rr	rr
r	Rr	rr

b)

	R	R
r	Rr	Rr
r	Rr	Rr

c)

	R	r
R	RR	Rr
r	Rr	rr

(5) a)

♀ / ♂	A	a
a	Aa	aa
a	Aa	aa

b)

♀ / ♂	A	a
A	AA	Aa
a	Aa	aa

c) 1/4 or 25%

3 in a row: $(0.25)^3 \times 100$

(6) a) black = dominant b) Bb x Bb ∴ 3:1 ratio

(7) A) male = white or bb. or black Bb.
B) female = heterozygous Bb.

(8) Results = all black offspring. You could test the theory by crossing two F_1 offspring to see if the female was pure.

* If female was not pure you would have ↑ probability of having white offspring.

(9) a)

	B	b
B	BB	Bb
b	Bb	bb

= 1/4 or 25%

b) 75% or 3/4 c) $(0.75)^4$ = 0.32 or 32%

d) $(0.25)^4$ ≈ .4%

(10).

	T	t
T	TT	Tt
t	Tt	tt

G: 1:2:1
P: 3:1

OR

	T	t
t	Tt	tt
t	Tt	tt

1:1 - G
1:1 - P.